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IS 11260-1 (1985): Stabilized power supplies ac output,
Part 1: Ratings and performance [ETD 31: Power Electronics]



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Indian Standard "पुनर्पठ १९९६"

"RE-AFFIRMED 1996"

**SPECIFICATION FOR
STABILIZED POWER SUPPLIES, AC OUTPUT
PART 1 RATING AND PERFORMANCE**

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR STABILIZED POWER SUPPLIES, AC OUTPUT

PART 1 RATING AND PERFORMANCE

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Indian Standard

SPECIFICATION FOR STABILIZED POWER SUPPLIES, AC OUTPUT PART 1 RATING AND PERFORMANCE

0. FOREWORD

0.1 This Indian Standard (Part 1) was adopted by the Indian Standards Institution on 28 February 1985, after the draft finalized by the Power Electronics Sectional Committee had been approved by the Electro-technical Division Council.

0.2 The standard on stabilized power supplies, ac output has been prepared in two parts as follows:

Part 1 Rating and performance

Part 2 Tests

These two parts are to be read in conjunction with each other.

0.3 The requirements for stabilized power supplies, dc output are covered separately in following Indian Standards:

IS : 7204 (Part 1)-1980 Stabilized power supplies dc output:
Part 1 Terms and definitions

IS : 7204 (Part 2)-1980 Stabilized power supplies dc output:
Part 2 Rating and performance

IS : 7204 (Part 3)-1980 Stabilized power supplies dc output:
Part 3 Radio frequency interference tests

IS : 7204 (Part 4)-1974 Stabilized power supplies dc output:
Part 4 Tests other than radio frequency interference.

0.4 While preparing this standard, considerable help has been derived from IEC Publication 686 (1980) 'Stabilized power supplies, ac output' issued by the International Electrotechnical Commission.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard applies to stabilized power supplies designed to supply ac power from an ac or dc source.

1.2 Calibrated stabilized power supplies for electrical measurement purposes are excluded from the scope of this standard.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions, in addition to those given in IS : 7204 (Part 1)-1980* shall apply.

2.1 Alternative Voltage (Current) Stabilization — A stabilization mode by which the ac output voltage (current) is the stabilized output quantity.

NOTE — The ac output voltage (current) can be stabilized with respect to the rms value, peak value or mean rectified value.

2.2 Waveform Stabilization — A stabilization mode by which the instantaneous value of ac voltage (current) is controlled such that a desired waveform of the voltage (current) is obtained.

2.3 Frequency Stabilization — A stabilization mode by which the output frequency is the stabilized output quantity.

2.4 Slewing Rate (Power Supply) — A measure of programming speed or current regulator response timing. The slewing rate measures the maximum rate of change of voltage across the output terminals of a power supply. Slewing rate is normally expressed in volts per second ($\Delta E / \Delta T$) and can be converted to sinusoidal frequency amplitude product by the equation

$$f(E_{pp}) = \frac{\text{Slewing rate}}{\pi}$$

where

E_{pp} = peak to peak sinusoidal volts.

or

Slewing Rate = $\pi f(E_{pp})$.

2.5 Phase Angle Stabilization — A stabilization mode by which* the ac output voltage is held within specified range of values of phase shift with respect to the phase of a reference voltage.

2.6 Unbalance of Load Impedance — For polyphase output of the stabilized power supply, a condition in which the value of the load impedance of at least one phase is significantly different from the value at the other phases.

*Specification for stabilized power supplies dc output: Part 1 Terms and definitions.

The unbalance can be expressed using symmetrical components in the case of a sine-wave.

2.7 AC Voltage (Current) Distortion — The deviation of the voltage (current) waveform from the desired waveform.

NOTE — Voltage (current) distortion can be expressed using quantities such as the following:

- a) dc voltage (current) content,
- b) Harmonic content,
- c) Harmonic components,
- d) Modulation,
- e) Random deviation, and
- f) Voltage (current) unbalance.

2.8 Harmonic Content — The function obtained by subtracting the fundamental component from a non-sinusoidal periodic function.

2.9 Relative Harmonic Content — The ratio of the rms value of the harmonic content to the rms value of the non-sinusoidal periodic function.

2.10 Harmonic Components — The components of the harmonic content as expressed in terms of the order and rms values of the Fourier series terms describing the periodic function.

2.11 Periodic Output Voltage Modulation — The periodic variation of output voltage amplitude at frequencies less than the fundamental output frequency.

2.12 Periodic Frequency Modulation — The periodic variation of the output frequency from its rated value.

2.13 Random Deviation — A random deviation of the output quantity from its desired value over a specified band with all influence and control quantities maintained constant.

3. RATING AND PERFORMANCE

3.1 General — The performance of a stabilized power supply shall comply with the specified values of the quantities listed in the manufacturer's data sheet or other documents mutually agreed to by the manufacturer and the user.

3.1.1 If not specified, rms values of voltage and current are meant.

3.2 Operating Conditions — Different performance rating are valid under different operating conditions. These conditions are defined by different sets of values or ranges of values of the influence quantities and the stabilized output quantity. In giving their values, no indication is given as to the permissible duration of their application. The various conditions have been specified in **3.2.1** to **3.2.3**.

3.2.1 Reference Conditions — Reference conditions are defined by values or ranges of value for the influence quantities and the stabilized output quantity which reflect typical operating conditions. Tables 1 and 2 list the quantities which serve as reference conditions.

TABLE 1 REQUIRED RATING DATA
(Clauses 3.2.1, 3.2.1.1, 3.2.2, 3.3, 3.3.1 and 3.5)

Sl. No.	INFLUENCE QUANTITY	REFERENCE CONDITIONS			RATED CONDITIONS (RATED RANGES OF VALUES)
		Reference Values	Tolerances		
			I*	G†	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Source voltage	Nominal value	± 1 per cent	± 3 per cent	ac input: 90 to 110 percent of nominal value; dc input: 85 to 115 percent of nominal value
ii)	Source frequency	Nominal value	± 1 per cent	± 1 per cent	97 to 103 percent of nominal value
iii)	Output current (constant voltage power supplies)	Nominal value or maximum value of rated range	± 1 per cent	± 2 per cent	nominal value or rated range
iv)	Output voltage (constant current power supplies)	Nominal value or maximum value of rated range	± 1 per cent	± 2 per cent	nominal value or rated range
v)	Unbalance of the load impedance (polyphase output)	Rated value of the load impedance (in amplitude and phase)	± 2 per cent	± 10 percent	20 percent of the nominal value of the load impedance
vi)	Power factor of the load	Rated value	± 0.05	± 0.05	rated range
vii)	Ambient temperature	27°C	± 1°C	± 3°C	0°C to 45°C
viii)	Cooling medium temperature (when different from ambient temperature)	Nominal value	± 3°C	± 5°C	air cooling: up to 40°C water cooling: up to 30°C
ix)	Cooling medium flow volume (forced cooling)	Nominal value	± 10 percent	+ 50 - 10 percent	down to 90 percent of nominal value
x)	Stabilized output Quantity				
a)	Output voltage (constant voltage power supplies)	Nominal value or maximum value of rated range	Not applicable	± 2 per cent	0 to 100 percent of nominal value or rated range
b)	Output current (constant current power supplies)	Nominal value of maximum value of rated range	Not applicable	± 2 per cent	0 to 100 percent of nominal value or rated range
c)	Output frequency (frequency stabilized)	Rated value	Not applicable	± 1 per cent	Rated value or rated range of values

*Tolerance applicable for the determination of intrinsic error.

†Tolerance applicable in general.

TABLE 2 OPTIONAL RATING DATA

(Clauses 3.2.1, 3.2.2, 3.2.1.1, 3.4 and 3.5)

Sl. No.	INFLUENCE QUANTITY	REFERENCE CONDITIONS			RATED CONDITIONS (RATED RANGES OF VALUES)
		Reference Values	Tolerance		
			I*	G†	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Total source voltage distortion	ac input: relative harmonic content up to 3 percent for intrinsic tolerance and 5 percent for general tolerance dc input peak-to-peak ripple up to 10 percent	+ 0 per- - 3 cent	± 3 per- cent	ac input: total harmonic content up to 10 percent dc input: peak-to-peak ripple up to 20 percent
ii)	Voltage unbalance	1 percent	—	—	3 percent
iii)	Relative humidity	65 percent	± 15 percent	+ 20 to - 40 percent	20 to 95 percent
iv)	Barometric pressure	101 kPa	± 5 kPa	+ 5 kPa - 15 kPa	86 to 106 kPa
v)	Magnetic field strength at source frequency	up to 1 A/m	—	—	0 to 100 A/m
vi)	Vibration	← ————— Under consideration ————— →			
vii)	Shock (product of peak acceleration and duration of shock pulse)	0·1 m/s	—	—	0·2 m/s

*Tolerance applicable for the determination of intrinsic error.

†Tolerance applicable in general.

3.2.1.1 The reference conditions serve:

- as conditions under which the intrinsic error may be determined. Therefore, the tolerances 'I' are applied to the conditions given in Tables 1 and 2.
- as a suggested specific condition for the determination of the validity of performance specification which may not be known or previously verified under rated conditions. Therefore the tolerances 'G' are applied to the conditions given in Tables 1 and 2.

3.2.1.2 The widened tolerances which typically apply to **3.2.1.1 (b)** relate to the initial setting of the quantities and may not be construed to denote permissible changes during the measurement.

3.2.2 Rated Conditions — Rated conditions are defined by simultaneously applicable rated ranges of values for the influence quantities and the stabilized output quantity over which the power supply is intended to operate and remain within its performance specification. These are given in Tables 1 and 2.

3.2.3 Limit Conditions — Limit conditions are defined by a limiting range of values for one influence quantity and rated ranges of values for the other influence quantities and the stabilized output quantity which can be tolerated by the power supply without damage, but within which it does not necessarily meet all performance specifications.

3.2.3.1 If limiting ranges of values are indicated for more than one influence quantity, they shall be permitted only on an individual basis, unless otherwise stated.

3.3 Required Rating Data — The nominal values or rated ranges for the quantities listed in Table 1 are required rating data.

3.3.1 Table 1 indicates further:

- a) which value is to serve as reference and which tolerances apply thereto, depending on the intention for which reference conditions are established; and
- b) which ratings may be assumed to constitute rated conditions, in the absence of an explicit statement.

3.3.2 Rated conditions listed in Table 1 are required ratings.

3.4 Optional Rating Data — The additional influence quantities listed in Table 2 may be of functional importance in unusual environments or when a power supply is particularly susceptible to them. The reference values and ratings recommended for this are given in Table 2. They constitute optional rating data.

3.5 Limit Influence Ratings — If limiting ranges of value are indicated for influence quantities in Tables 1 and 2, those performance ratings that are no longer met must be specified.

3.6 Performance Ratings — Tables 3 to 8 give a summary of quantities. In specifying the performance of a power supply, a distinction is made between mandatory performance ratings and others where performance ratings are merely recommended; mandatory indications are in *italic* type in Tables 3 to 8.

3.7 Slewing Rate Requirements — Slewing rate requirements shall be as agreed to between the purchaser and the supplier.

TABLE 3 PERFORMANCE RATINGS — QUANTITIES RELATED TO SOURCE

(Clause 3.6)

Sl. No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Ref to Clause in IS : 11260 (Part 2)-1985*]	Definition
(1)	(2)	(3)	(4)	(5)	(6)
i)	Inrush current	Maximum instantaneous value, approximate duration of transient	Rated conditions, maximum instantaneous peak source voltage drop less than 10 percent of rated peak value	5.5	2.10 of IS : 7204 (Part 1)-1974†
ii)	<i>Rated source current</i>	Typical rms value for ac Typical mean value for dc	Rated conditions	5.3	—
iii)	Efficiency	Unit or system efficiency, typical value	Reference conditions and at arithmetic mean of control range limits	5.3	2.12 of IS : 7204 (Part 1)-1974†
iv)	Power factor	Typical value/range as applicable	—	5.3	2.9 of IS : 7204 (Part 1)-1974†
v)	Relative harmonic content of source current	Maximum percentage value	Rated conditions, relative harmonic content of source voltage less than 5 percent	5.3	2.9
vi)	Ripple on dc source current	Maximum rms value or peak to peak value	Rated conditions super-imposed ripple on source voltage less than 3 percent rms or 10 percent peak-to-peak respectively	2.3, 5.3	4.6 of IS : 7204 (Part 1)-1974†
vii)	Input power at no load	Maximum value	Rated conditions	5.3	—

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 1 Terms and definitions.

TABLE 4 PERFORMANCE RATINGS — QUANTITIES RELATED TO STEADY STATE CONDITIONS
(OUTPUT QUANTITIES)

(Clause 3.6)

SL No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Ref to Cl in IS : 11260 (Part 2) - 1985* (see also Note 2)]	Definition
(1)	(2)	(3)	(4)	(5)	(6)
i)	<i>Load effect</i> (see Note 1)	Maximum value expressed as percentage of the stabi- lized output quantity or as absolute value or both	Rated conditions	4.4	4.3 of IS : 7204 (Part 1)-1974†
ii)	<i>Source voltage effect</i> (see Note 1)	do	do	do	do
iii)	Source frequency effect	do	do	do	do
iv)	<i>Temperature effect</i> (see Notes 1 and 3)	do	do	do	do
v)	<i>Temperature coefficient</i> (see Notes 1 and 3)	do	do	do	4.5 of IS : 7204 (Part 1)-1974†
vi)	Other individual effects	do	do	do	4.3.1 of IS : 7204 (Part 1)-1974†
vii)	Combined effects	do	do	do	4.3.3 of IS : 7204 (Part 1)-1974†
viii)	<i>Total effect</i> (see Note 4)	do	do	do	4.9 of IS : 7204 (Part 1)-1974†
ix)	<i>Tolerance band</i> (see Note 4)	do	do	do	4.11 of IS : 7204 (Part 1)-1974†
x)	<i>Harmonic content</i>	Maximum rms or peak-to- peak value or both	Rated conditions, kind of load Frequency range: 0.01 pu of rated frequency to 10 MHz	5.4	2.8

xi)	dc content	Maximum value	Rated conditions, reference conditions for load unbalance	5.4	2.7
xii)	Voltage unbalance (polyphase output)	Value and phase shift of each phase voltage or values of symmetrical components	do	4.2.2	2.6
xiii)	Modulation (periodic voltage or frequency)	Maximum value and upper frequency limit	Reference conditions, considered frequency range: zero to rated frequency	4.5 and 4.6	2.11 and 2.12
xiv)	Settling effect (see Note 5)	Maximum value, influence quantity subject to change	Rated conditions	(see Note 2)	4.8 of IS : 7204 (Part 1)-1974†
xv)	Settling time (see Note 5)	do	do	(see Note 2)	4.12 of IS : 7204 (Part 1)-1974†
xvi)	Load characteristic	—	—	—	4.17 of IS : 7204 (Part 1)-1974†

NOTE 1 — This requirement is mandatory only, if total effect or tolerance band or both are not specified.

NOTE 2 — Relevant provisions of IS : 7204 (Part 4)-1980‡ are also applicable.

NOTE 3 — A specification is required for only one of the items at Sl No. (iv) and (v).

NOTE 4 — This requirement is mandatory only if load effect, source voltage effect and either temperature effect or temperature coefficient are not specified. Only one of items at Sl No. (viii) and (ix) is required.

NOTE 5 — This requirement is mandatory only if the settling effect is not included in the individual effect modulation.

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 1 Terms and definitions.

‡Specification for stabilized power supplies, dc output: Part 4 Tests other than radio frequency interference.

TABLE 5 PERFORMANCE RATINGS — QUANTITIES RELATED TO DYNAMIC CONDITIONS
(OR TRANSIENTS)

(Clause 3.6)

SL No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Ref to Clause in IS : 11260 (Part 2) - 1985*]	Definition [Ref to Clause IS : 7204 (Part 1) - 1974†]
(1)	(2)	(3)	(4)	(5)	(6)
i)	<i>Maximum overshoot amplitude</i> Maximum under shoot amplitude }	Maximum value, quantity subject to step change; magnitude and direction of step change	Rated conditions, consi- dered frequency range: 0 to 100 MHz. Total transient recovery time	4.18	5.2.1 and 5.3
ii)	Maximum output rate of change	Maximum value, quantity subjected to step change, magnitude and direction of step change, width of recovery band unless equal to corresponding effect band or unless the total effect band or tolerance band serves as recovery band	Rated conditions	4.16 and 4.17	5.4
iii)	Transient delay time	do	do	4.1.4	5.5.1.1
iv)	Transient recovery time	do	do	4.7 and 4.16	5.5.1.2
v)	<i>Recovery time</i>	do	do	4.7 and 4.14	5.5.1
vi)	Turn-on delay time	Maximum value	Reference conditions	4.14	5.5.2

vii)	Turn-on recovery time	Maximum value	Reference conditions	4.14	5.5.3
viii)	Turn-off decay time	Maximum value	Reference conditions, end of decay at 1 percent of maximum rated value	4.14	5.5.4
ix)	Turn-on (turn-off) overshoot	Maximum value	Reference conditions	4.14 and 4.18	5.2.2
x)	Start-up time	do	do	4.14	4.12.1
xi)	Warm-up time	do	do	4.1.2	4.12.2
xii)	Output impedance	Typical value as a function of frequency	do	4.7	5.6

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 1 Terms and definitions.

TABLE 6 PERFORMANCE RATINGS — QUANTITIES RELATED TO CONTROL

(Clause 3.6)

SL No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Clause in IS : 11260 (Part 2) - 1985*] (see also Note)	Definition [Clause in IS : 7204 (Part 1) - 1974†]
(1)	(2)	(3)	(4)	(5)	(6)
i)	Setting range	Maximum value for upper limit and minimum value for lower limit of stabilized output quantity	Limit conditions, if any, otherwise rated conditions	(see Note)	4.13
ii)	Control range	Minimum value for upper limit and maximum value for lower limit of stabilized output quantity	Rated conditions	(see Note)	4.13.1
iii)	Discontinuous control (resolution)	Typical value	Reference conditions but whole control range of stabilized output quantity	4.15	4.14
iv)	Incremental control coefficient	do	do	do	4.14.1
v)	Control coefficient	Nominal value	—	do	4.16
vi)	Control deviation band	Upper and lower limit values of the output quantity as a function of the control quantity	—	do	4.16.2
vii)	Control rate	Maximum value	—	do	4.15
viii)	Control time constant	—	—	do	4.15.1
ix)	Intrinsic error	—	—	—	4.2.2

NOTE — Relevant provisions of IS : 7204 (Part 4)-1980‡ are also applicable

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 1 Terms and definitions.

‡Specification for stabilized power supplies, dc output: Part 4 Tests other than radio frequency interference.

TABLE 7 PERFORMANCE RATINGS — QUANTITIES RELATED TO LIMIT CONDITIONS

(Clause 3.6)

SL No.	SPECIFIED QUANTITY		SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
					Test [Ref to Cl in IS : 11260 (Part 2) - 1985*] (see also Note)	Definitions [Ref to Cl in IS : 7204 (Part 1) - 1974†]
(1)	(2)		(3)	(4)	(5)	(6)
i)	Current limiting threshold		Minimum value; setting range, if any	Limit conditions, if any; otherwise rated conditions except for the unstabilized output quantity	5.2	7.9.1
ii)	Voltage limiting threshold		do	do	do	7.10.1
iii)	Maximum current	limited	Maximum value; setting range, if any; maximum duration of operation, if other than infinite	Limit conditions, if any; otherwise rated conditions except for the whole setting range for the stabilized output quantity	do	7.9.2
iv)	Short circuit current		do	do	5.1	7.9.3
v)	Open circuit voltage		do	do	5.2	7.10.2
vi)	Crossover area		Position and size of the widened load effect band or tolerance band	Rated conditions	(see Note)	2.5
vii)	Over-current protection		Protective device; reset typical value for tripping threshold, setting range, tripping margin, tripping delay, overshoot, maximum duration of overshoot	Limit conditions, if any; otherwise rated conditions except for the unstabilized output quantity	5.1.2 and 5.2.2	7.3

(Continued)

TABLE 7 PERFORMANCE RATINGS — QUANTITIES RELATED TO BOUNDARY CONDITIONS — *Contd*

SL No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Ref to Cl in IS : 11260 (Part 2)-1985* (see also Note)	Definition Ref to Cl in IS : 7204 (Part 1)- 1974†]
(1)	(2)	(3)	(4)	(5)	(6)
viii)	Over-voltage protection	Protective device; reset typical value for tripping threshold, setting range, tripping margin, tripping delay, overshoot, maximum duration of overshoot	Limit conditions, if and; otherwise rated conditions except for the unstabilized output quantity	(see Note)	7.4
ix)	Reverse power protection	Maximum value and duration of reversed power at output terminals	Rated conditions and non-energized condition	—	7.6

NOTE — Relevant provisions of IS : 7204 (Part 4)-1980‡ are also applicable.

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 1 Terms and definitions.

‡Specification for stabilized power supplies, dc output: Part 4 Tests other than radio frequency interference.

TABLE 8 PERFORMANCE RATINGS — MISCELLANEOUS

(Clause 3.6)

SL No.	SPECIFIED QUANTITY	SPECIFIED DATA	APPLICABLE CONDITIONS	REFERENCE	
				Test [Ref to Cl in IS : 11260 (Part 2) - 1985*]	Definition [Ref to Cl in IS : 7204 (Part 1) - 1974†]
(1)	(2)	(3)	(4)	(5)	(6)
i)	Isolation voltage	Maximum value, terminals considered	Rated conditions	5.7	3.6
ii)	Insulation resistance	Minimum value, terminals considered, test voltage	Non-energized conditions	5.6	3.5
iii)	Insulation test voltage	rms value, duration terminals considered	do	do	3.5.1
iv)	Capacitance to source	Maximum value, terminals considered	do	5.8	3.4.1
v)	Capacitance to frame	do	do	do	3.4
vi)	Common mode current	Maximum value, terminals considered	Reference conditions	21 of IS : 7204 (Part 4) - 1980‡	3.7
vii)	Audible noise	A weighted sound level maximum value, location of microphone	Rated conditions	5.10	—
viii)	Electromagnetic interference emanation	Under consideration	Under consideration	5.9	—
ix)	Cooling medium temperature	Kind, cooling medium	Rated conditions	—	3.2
x)	Protection of enclosure	Degree	—	IS : 2147-1962§	—
xi)	Protection against electrical shock	Class	—	IS : 9409-1980	—

*Specification for stabilized power supplies, ac output : Part 2 Tests.

†Specification for stabilized power supplies, dc output : Part 1 Terms and definitions.

‡Specification for stabilized power supplies, dc output : Part 4 Tests other than radio frequency interference.

§Degrees of protection provided by enclosures for low-voltage switchgear and controlgear.

||Classification of electrical and electronic equipment with regard to protection against electric shock.

4. PHYSICAL CHARACTERISTICS

4.1 Dimensions

4.1.1 Overall Dimensions — Overall dimensions shall include all parts that are attached to the power supply and are required for its operation, such as control knobs, terminal housing, feet, including minimum bend radius of source cords.

4.1.2 Order of Dimensions — Dimensions should be listed in the order height \times width \times depth.

4.1.3 Height — Height is the overall dimension in the vertical direction of normal usage.

4.1.4 Width — Width is the overall horizontal dimension parallel to the surface which is intended to be accessible during operation or for setting.

4.1.5 Depth — Depth is the overall horizontal dimension perpendicular to the plane described by height and width.

4.1.6 Internal Depth — In the case of rack-mounted power supplies, an additional dimension is required, 'internal depth' which is that dimension in the same direction as depth, but measured from the mounting surface.

4.1.7 Clearance Dimension — If clearance is required for proper operation of the power supply, the dimensions of the extra spaces to be available shall be listed in the same order as the overall dimensions for each main limiting surface of the power supply.

4.2 Mass — List the total mass including all parts attached to the power supply during normal operation. In the case of fluid-filled units, this includes the fluid.

4.3 Mounting Position — If it is not obvious from the construction, and if it is required that the power supply be mounted in a specified manner, an arrow pointing 'up' shall be marked on the vertical surface.

5. EARTHING

5.1 In each unit, two power earth terminals shall be provided in effective electrical contact with cubicle framework. All metal parts of the components of the unit which do not carry current shall be bonded thereto. The terminals shall be suitable for terminating earth conductors.

6. MARKING

6.1 The following information shall be given on a rating plate permanently affixed to the power supply:

- a) Name of the manufacturer;
- b) Model number;
- c) Serial No. (optional);
- d) Output ratings: Rated values or rated ranges of output voltage, current, frequency, number of phases;
- e) Input ratings: Nominal value for source voltage, source current and frequency, number of phases;
- f) Protection class in accordance with relevant Indian Standard; and
- g) Mass (optional).

6.1.1 Power supply may also be marked with ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. TESTS

7.1 Unless otherwise agreed to between the manufacture and the user, the tests shall normally be carried out at manufacturer's works. The detail of the tests are given in IS : 11260 (Part 2)-1985*.

7.1.1 The method of test for radio frequency interference is specified in IS : 7204 (Part 3)-1980†.

*Specification for stabilized power supplies, ac output: Part 2 Tests.

†Specification for stabilized power supplies, dc output: Part 3 Radio frequency interference tests.